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The Regional Municipality of  
Hamilton-Wentworth

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# **Solid Waste Management System**

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## **Synthesis Report**

July 1978



FEB 3 1981


THE REGIONAL MUNICIPALITY OF  
HAMILTON-WENTWORTH

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SOLID WASTE MANAGEMENT SYSTEM

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# THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

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*Mailing Address:* P.O. BOX 910, HAMILTON, ONTARIO L8N 3V9

July 25th, 1978.

Councillor R. Wheeler  
Chairman  
Regional Engineering Services Committee

Dear Councillor Wheeler:

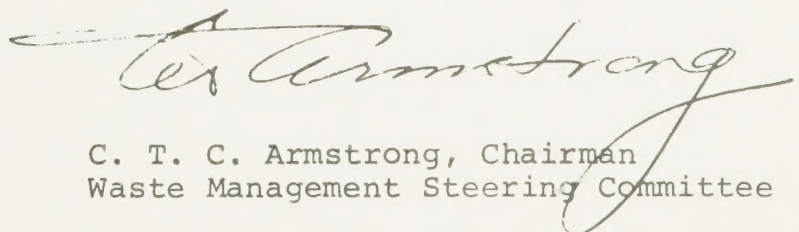
Re: Solid Waste Management System  
Synthesis Report

As explained at the special meeting of your Committee on Monday, July 24th, I am submitting herewith for your information a copy of the attached report which summarizes the evolution of the Waste Management System for the Hamilton-Wentworth Region.

The information presented in this report will aid all interested parties to understand the problem of the disposal of solid waste within the Region and the proposed solution. The landfill operation is discussed in the context of the whole waste management system. This report will be used to accompany the application to the Ministry of the Environment when applying for a Certificate of Approval for the recommended landfill operation.

Copies of this report will be made available to interested groups or agencies for their information. The detailed technical reports will be available for review at the offices of the Regional Engineering Department. In this way all relevant information will be available to individuals and organizations who are interested.

Yours very truly,



C. T. C. Armstrong, Chairman  
Waste Management Steering Committee



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## 1.0 INTRODUCTION

*The purpose of this report is to present in concise summary form, the evolving solution to the solid waste management needs of Hamilton-Wentworth Region over the period 1980 to 1990 and beyond. The problem is outlined in Section 2 and the specific proposal is given in Section 3.*

*The recommended solution described herein has evolved through a process of discussion and negotiation among government organizations, the public and private enterprise. A series of reports and Council resolutions trace this process which began in 1972 (before Region was formed). Section 5 discusses the evolution of the proposal.*

*It is hoped that the information presented here will aid all interested public and private parties to be better informed of the Region's problems and actions to date concerning the proposed solid waste management system. Further, this report will accompany an application to the Ministry of the Environment for a Certificate of Approval for the recommended landfill operation. It will also provide a focus for any hearings or other applications needed to implement the proposal.*

*The impact of the proposal has been given special attention in Section 4. Environmental and economic impacts of the proposal are considered for components of the system. Site specific impacts and region-wide impacts are weighed.*

*This report touches upon the topics of general concern where policy decisions are required. Detailed considerations have been explored in a series of supporting technical reports which deal with: transfer station site selection; noise impact at the landfill site, land use impact, hydrogeology;*



*transportation; environmental impact; landfill site selection; end use; design and operation. Supporting documents are listed in Section 8.*







## 2.0 THE EXISTING PROBLEM

*The major waste management problem existing today is one of landfill capacity. The tonnage of waste that the Region must deal with continues to grow each year. This is likely to continue for some time in spite of the growing interest in recycling and conservation. The present technology of handling solid waste requires landfill for disposal. The two principal landfill sites in Hamilton-Wentworth will be filled beyond their ultimate practical storage capacity by March 1980. Therefore additional landfill space must be found and made operational prior to that date.*

*Supplementary problems also exist. First, there is the fact that technological advancement in solid waste management techniques is imminent in North America. The Hamilton Solid Waste Reduction Unit (SWARU) and other proposed processing facilities now being encouraged by new programs of the Ontario government, are currently unproven. While these techniques hold great promise for the future, they cannot be relied upon as an immediate comprehensive solution. At the same time, this new technology is too significant to be ignored. Therefore, a waste management strategy in Hamilton-Wentworth must be flexible enough to provide for such developments.*

*Second, there have been examples of lack of effective management of solid waste facilities throughout North America. Such examples arouse the fears and suspicions of persons with environmentally responsible concerns. Such fears must be calmed by implementing effective design and operation measures. This requires the development of a technically sound proposal with a clear and realistic view of the unavoidable impacts. We have specifically addressed ourselves to these concerns.*





## 2.1 The Present System

*There are currently two principal sanitary landfill operations in Hamilton-Wentworth. These are the Ancaster Landfill and the Upper Ottawa Street Landfill.*

*Approximately 85 percent of the Region's waste is generated in Hamilton, Stoney Creek and Glanbrook. Most of this waste is transported to the Upper Ottawa Street Landfill. The remainder is processed at SWARU. The Upper Ottawa Street Landfill already exceeds its design grade, suffers from a lack of on-site cover material, and is beginning to impose severe obnoxious effects on the surrounding urban development.*

*Approximately 15 percent of the Region's waste is generated in Dundas, Ancaster and Flamborough. These wastes are delivered to the Ancaster Landfill. Even though this site was recently expanded, the capacity now available would be sufficient to handle less than six months total collected waste generated in the Region.*

*The Hamilton Solid Waste Reduction Unit (SWARU) is operating and does successfully dispose of some tonnages of waste. For a combination of reasons SWARU now operates well below its design capacity (approximately at the rate of 30 percent).*

*The collection system which covers most of the Region and which has developed over many years is not the responsibility of Regional Council. It includes private and area municipal involvement. No attempt has been made in this proposal to adversely change or affect the established collection system.*





## 2.2 Disposal Needs

The wastes collected privately and by Area Municipalities, for disposal by the Region, are variously estimated to range between 430,000 to 760,000 tons per year. The landfill disposal needs of the system are also discussed in the Landfill Design and Site Operation Report. Recent evaluations of the quantities suggest that for current design needs, a waste management system should be provided that will cope with 600,000 tons per year (plus or minus 10 percent). The Full Service Solid Waste Management Contract, which is part of the proposed solution, was prepared on this latter basis.

Below is a table of the approximate annual collected tonnages of solid wastes to be dealt with. These arise from the three designated collections areas in the Region. The quantities are considerable in view of the existing disposal space limitations.

TABLE 1: 1977 Estimates of Annually Collected Waste by Source (Tons per year)						
Collection Area	Residential Municipal	Manufacturing	Retail	Service	Other	Totals
West	17,500	11,000	1,000	1,500	1,000	32,000
North	94,000	320,500	13,000	42,000	13,000	482,500
South	58,500	5,500	3,500	16,500	1,500	85,500
Totals	170,000	337,000	17,500	60,000	15,500	600,000

The Regional Solid Waste Management System components including the transfer stations, haul system, SWARU and the sanitary landfill site have been sized to handle these amounts of wastes initially. Each has the capability of being expanded if necessary.

The one component with variable life is the proposed landfill. Pressures are now being brought to bear across a wide front to reduce the dependency upon sanitary landfilling. Hopefully, as society changes its outlook upon waste generation, resource recovery and energy from wastes, there will be a reduction in quantity of waste requiring disposal in a landfill site.





*Based upon optimistic predictions of the effect of these social pressures, we believe that the site will have a 20-year life. An extended site life is highly desirable bearing in mind that landfill sites are costly, and their acquisition and establishment is expected to become an increasingly difficult task in the future.*







### 3.0 THE PROGRAM

*The concept which has evolved to date includes five components including:*

- a). A COLLECTION SYSTEM, which is required to gather the solid waste at the home or business establishment and deliver it to several central transfer stations. This collection system is not a Regional responsibility. It is the responsibility of the area municipalities and private enterprise.*
- b). TRANSFER STATIONS, which are depots for receiving and transshipping wastes. Here large completely enclosed transfer trucks are loaded with the waste for economic haul to the landfill or other processing site. Transfer stations will immediately provide a means of traffic control and of regulating the types of waste accepted. They will provide a convenient economic point of discharge for the collection agencies. Ultimately, such stations could be converted to front-end processing facilities in a resource recovery system.*
- c). The SOLID WASTE REDUCTION UNIT (SWARU), which incinerates waste to generate steam power and also recovers metal. This reduces the volume of material that would otherwise require further handling.*
- d). A HAUL SYSTEM, which consists of large transfer vehicles hauling along routes over prescribed major roadways in the Region (unless otherwise specifically approved by the Region). Transfer vehicles are expected to be the only vehicles delivering waste from the transfer stations to the landfill.*





e). A SANITARY LANDFILL SITE, where non-inert waste is compacted and buried in earth-covered cells to safely decay and eventually stabilize without polluting surface or groundwater resources. Other landfill sites are required for ultimate disposal of inert material such as construction debris. Selected inert material can be placed in existing inactive quarries since it would have no detrimental leaching effect and can be used for the rehabilitation of such sites.

The following discussion outlines the scale and mode of operation of each of the components of the waste management system. The locations of these components and the garbage collection areas are shown on the Solid Waste Management System drawing.



### 3.1 Collection System

*No changes are proposed over the present method of picking up waste at its many points of generation. There will be some changes in the locations at which these wastes are deposited.*

*North, South and West Collection Areas have been identified in expectation of where the waste will originate that will be received at the three transfer stations. Areas were determined by reviewing existing collection systems and areas, natural boundaries, municipal boundaries, and other factors. Contributors to each collection area are expected to be as follows:*

#### North Collection Area

*City of Hamilton (below escarpment) and Town of Stoney Creek (below escarpment).*

#### South Collection Area

*Town of Ancaster, Township of Glanbrook, City of Hamilton (above escarpment), and the Town of Stoney Creek (above escarpment).*

#### West Collection Area

*Township of Flamborough and Town of Dundas*







### 3.2 Transfer Stations

Three transfer stations will be utilized. The Dundas Transfer Station with 130,000 tons per year capacity will receive waste from the West Collection Area. The Mountain Transfer Station with an initial capacity of 130,000 tons per year (ultimate capacity 220,000 tons) will receive waste from the South Collection Area. The Kenora Avenue Transfer Station with an initial capacity of 350,000 tons per year (ultimate capacity 440,000 tons) will receive waste from the North Collection Area.

All three transfer stations are based on sound transfer station design, the accepted Ministry of the Environment standards and demonstrated operating experience. Special attention has been given in the design to environmental considerations including location, dust control, wash water, odour, fire, litter and noise.

The combined annual rated capacity of the stations initially is 610,000 tons per year. The ultimate capacity is 790,000 tons per year. The two largest stations, Mountain and Kenora, are designed to provide for the implementation of on-site resource recovery at a later date. These stations will provide a functional, flexible system which can accommodate the Region's waste for the foreseeable future. Transfer stations will be operated 8:00 a.m. to 6:00 p.m., six days per week with the exception of certain statutory holidays.



### 3.3 SWARU

*SWARU will remain as an integral part of the waste management system. SWARU will be modified and will process 120,000 tons of waste per year as guaranteed in the Waste Management Contract. The contract is discussed in detail in the Management Section below.*

*SWARU presently operates at approximately 50,000 tons per year. As plant modifications are made, it is expected that a 150,000 tons per year throughput at SWARU is attainable. This tonnage throughput (25 percent of estimated wastes to be handled) comes close to the number of tons of residential wastes collected by the Area Municipalities (estimated on Table 1 to be 170,000 tons per year). Upon the attainment of this throughput, Hamilton-Wentworth will join the very few major municipalities in North America who convert a significant percentage of their wastes through resource recovery.*



### 3.4 Landfill

*The proposed sanitary landfill will be located on Lots 26, 27 and 28, Concession 9 and 10 in the Township of Glanbrook. The total area of property to be acquired is approximately 537 acres of which approximately 250 acres will be used for landfilling of waste. The remaining area will be used for buffering purposes. The site is shown on Drawing G1 - Existing Site Plan.*

*Access to the site will be from Highway No. 56 along the road allowance between Concession 9 and Concession 10 in the Township. The short access road from Highway No. 56 will become a Regional Road. Access onto the site will be strictly limited to transfer vehicles. The landfill site will be operated from 8:00 a.m. to 8:00 p.m.*

*The detailed operation and management of the site is reviewed in Appendix A and detailed in the Landfill Design and Operation Report. Similarly the approach to the end use and rehabilitation of the site is reviewed in Appendix B and detailed in the Landscape Architecture Report.*

*Every effort will be made to eliminate the immediate and long term impacts of the landfill operation on the site and its environment. To this end, the main impacts have been identified and discussed individually in Section 4 of this report.*

*Although most fears based upon past experiences with improper operation of landfill sites can be relieved by the measures referred to above, some fears may persist. There is however, no immediate alternative to a landfill operation. Support for this statement is given first in policies contained within the present draft Official Plan of Hamilton-Wentworth Region and further in recent comments of the Ontario Minister of the Environment in the House. These references are as follows:*





### Regional Official Plan Policies

Section 11.2 of the Draft Official Plan of the Region outlines the policies of the Region with regard to the disposal of solid waste. These policies are as follows:

- 1). The Region will cooperate with and coordinate the functions of the Area Municipalities in collection and haulage of solid waste to Regional disposal facilities.
- 2). The Region will establish disposal and transfer facilities within the Region to equitably serve the citizens of the Region in the most economical and environmentally acceptable means available.
- 3). Solid waste landfilling is a legitimate means of disposal available for the immediate future. A landfill site will be provided by the Region that is efficiently designed and operated to protect the environment and the public health of the community.
- 4). Resource recovery and recycling from solid waste generated in the Region is a desirable goal to protect the supply and natural resources and energy, and to minimize the impact of solid waste disposal of the environment. A programme to initiate resource recovery facilities, compatible with the financial means of the Region and available markets for recovered resources, will be pursued.
- 5). Recycling of solid waste materials separated at source and collected and marketed by local private organizations is commended at this time and will be encouraged when compatible with the aims of the Regional Waste Management Programme.
- 6). The Region will cooperate with the Governments of Ontario and Canada to develop any programmes which are aimed at the reduction in the quantities of solid wastes generated at source and are to the mutual benefit of all parties.

The proposed system for the disposal of solid waste is in accordance with these policy statements.





Statement of the Honorable Mr. McCague, Minister of the Environment

On June 20th, 1978, in the Legislature of Ontario, the Honorable Mr. McCague stated that:

"Because resource recovery is so critically dependent upon reliable markets for reclaimed material, the current economic constraints are also hindering the establishment of these markets. While resource recovery is a proven philosophy, the technology for efficient, comprehensive recycling remains unproven. A lot of work has to be done".

The Minister also quoted the Technical Director of the National Solid Wastes Management Association who summarized the situation with regard to the existing resource recovery facilities:

"The results of the first generation of projects indicate that the best of them can be characterized as limited successes while others have proven to be outright failures".

The Minister then went on to state:

"The fact is that resource recovery is not an instant solution to our waste management problems in this province. We have never regarded it as such, although we do believe that resource recovery, when fully developed, will be an integral part of the efficient solid waste management of the future".

"As we develop resource recovery, there will be a continuing need for landfill capacity in Ontario to accommodate waste which can not be recycled or which has no energy value".



### 3.5 Haul System

*All waste will be hauled from the transfer stations to the landfill site in totally enclosed 75 cubic yard transfer vehicles. The routes to be used by these transfer vehicles are shown on the Solid Waste Management System drawing. All roads are either Regional roads or Provincial highways. There will, therefore, be no additional costs to the Area Municipalities for the maintenance of these roads.*





### 3.6 Management

*The Regional Municipality of Hamilton-Wentworth have entered into an agreement with Tricil Limited for the operation by Tricil of a "Full Service Solid Waste Management System" for a ten-year period. This agreement generally states that Tricil will do the following:*

- 1. Lease, convert, operate and maintain SWARU at a guaranteed tonnage of 120,000 tons per year.*
- 2. Design, construct, lease and operate three transfer stations.*
- 3. Receive waste at the transfer stations and at SWARU.*
- 4. Transport waste from the transfer station to the landfill site.*
- 5. Receive waste from the transfer stations.*
- 6. Lease the landfill site from the Region and carry out the waste disposal operation.*

*By entering into this agreement with Tricil, the Region have obtained the services of a major private company with considerable experience in the design, construction, management and operation of waste management systems. In addition, Tricil Limited has full access to the resources and management capabilities of Trimac Limited and Canadian Industries Limited who jointly own Tricil. Canadian Industries Limited are presently marketing the SWARU concept throughout the world and have therefore, considerable incentive to bring SWARU to peak efficiency through its Tricil subsidiary and prove the concept is a viable, efficient and economic means of disposing of solid waste. This incentive is in addition to the financial benefits that will accrue to Tricil if SWARU is brought up to the 120,000 tons per year guaranteed throughput.*







*Tricil have designed and constructed and presently operate the first and only privately owned transfer station in Canada. At this transfer station, located in Kingston, Tricil also carry out major resource recovery work on the production of refuse derived fuel (R.D.F.) and conversion of this R.D.F. to a low B.T.U. fuel gas.*





#### 4.0 IMPACT OF THE PROGRAM

*The impact of a program of this scale is felt throughout the Region. Immediate and long term effects are brought to bear on the natural environment as well as on present and future economic options. Following sections of this report examine the impacts of each of the components of the solid waste management system in turn.*

*The overall impact on the Region is a very favourable one. The system provides an immediate feasible solution to the problem of the Region's solid waste crisis. The program holds great promise for the following reasons:*

- as a private enterprise operation the operation of the system will be required to remain economically viable*
- as a "Full Service System" there will be opportunities for economies of scale*
- a single agency will be held economically accountable and administratively responsible for the proper operation of the system*
- the application of improved technology (transfer stations, SWARU, a managed landfill site, modern equipment) will enable a more efficient and effective operation*
- the attention that has been given to the environment in planning each component of the system will ensure a superior level of protection of the environment as the system is operated and when full capacity is reached*
- as an interim strategy in a time of technological change, the program provides options for prudent courses of action leading to greater use of resource recovery techniques*





#### 4.1 Impact of Haul System and Transfer Stations

*The system of three transfer stations and a restricted access landfill site will have favourable implications over present conditions. Every effort will be made to eliminate noise, congestion, odour and visual impacts.*

*Hauling and unloading by commercial carriers at transfer sites will be convenient and will be distributed over three sites rather than the current two sites. The large number of small volume deliveries by private vehicles will be similarly distributed and will be separated from the landfill operations.*

*Transfer sites have been selected according to appropriate criteria to minimize the effects on the neighbourhood.*

*Hours of operation of transfer stations are to be restricted to 8:00 a.m. to 6:00 p.m.*

*The design of the new transfer stations has included measures inside and outside each building to prevent undesirable effects. These measures include aesthetic architectural treatment, dust collection systems, wash water drains to sanitary sewers, short term rather than extended term storage to minimize odour, high capacity fire sprinkler systems, control fencing, and selection of equipment designed to reduce noise levels. Details and drawings are presented in the "Report on Transfer Station Site Selection".*







#### 4.2 Impact of SWARU

*The upgrading of the SWARU operation will have increasingly positive impact on the waste management system as time passes. The Immediate environment at the SWARU site should be no more adversely affected than at present as plant throughput rises to the 120,000 tons per year level. However the advantages to the Region grow in importance.*

*The volume of waste to be transported and then handled at the landfill site reduces correspondingly as SWARU's processing capability climbs. Landfill site life is therefore extended and the need to expand the landfill or find a new location becomes less urgent.*

*The SWARU operation increases in economic viability as its processing volume increases. At the same time the operation continues as a demonstration of the potential of resource recovery methods.*





#### 4.3 Impact on the Landfill Site Area

*The landfilling operation is a managed activity that will occur over a reasonably long time (perhaps 20 years).*

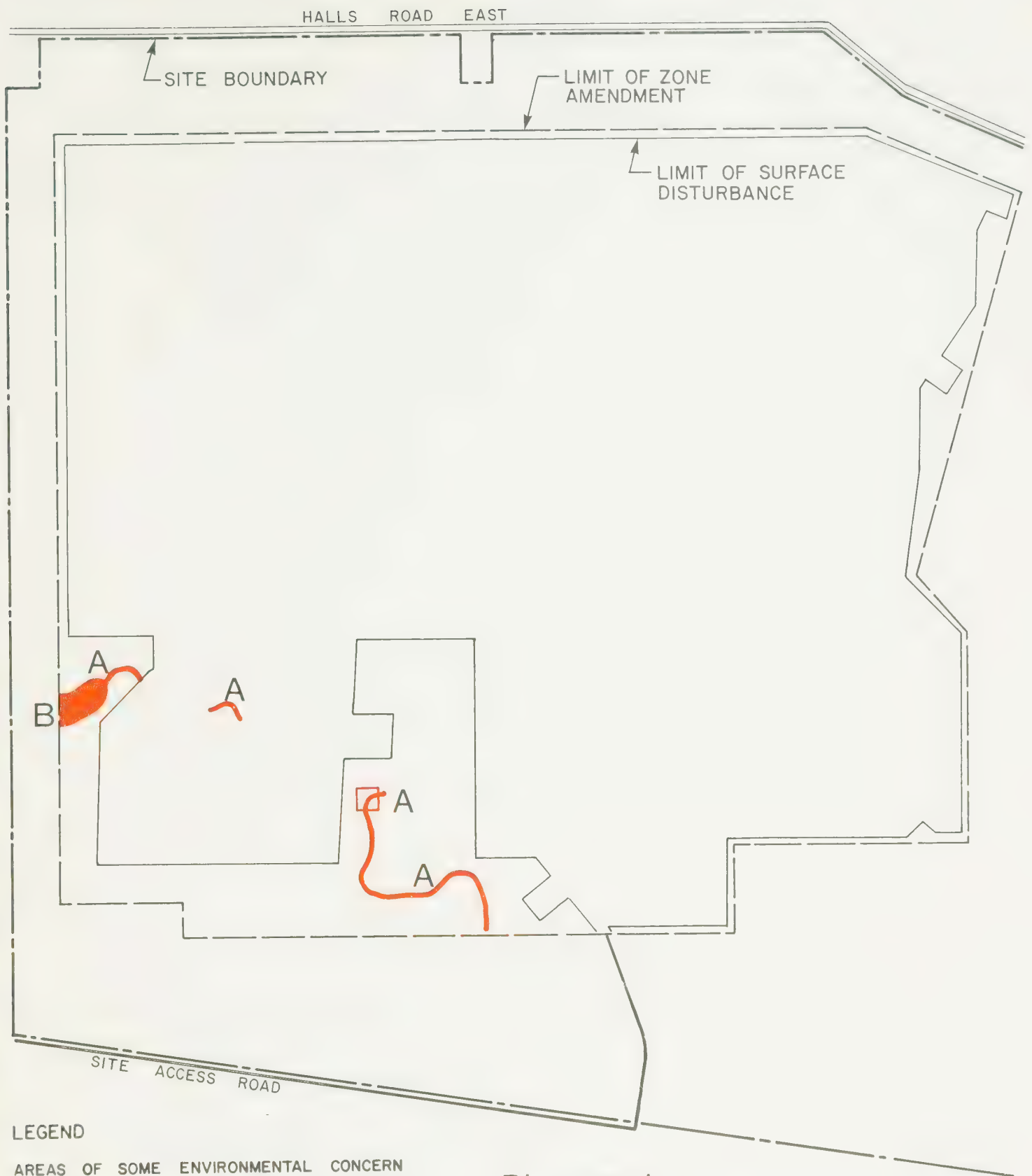
*Recognizing this, an operating plan has been developed to minimize the impact of the landfilling activity as it is underway. This operating plan is discussed in Appendix A. A further feature of the plan is that early attention is given to achieving the ultimate end use of the site through a program of progressive site rehabilitation. This aspect is discussed in Appendix B.*

*Immediate impacts of the landfilling operation have been anticipated. Where these impacts were judged as serious or avoidable, necessary action has been incorporated into the operating plan.*

*Natural plant and animal life was considered in the Environmental Assessment report. It is noted that while some uncommon species of life were reported within the site, no major unique environmental areas warranting preservation appear to exist within the relevant portion of the site. That is, no fragile zones were identified within the area to be excavated and later rehabilitated (see Diagram 1).*

*Groundwater contamination of wells or base flow discharge to the surface waters was assessed not to be a problem in the Hydrogeological Report. This is due to the high clay content, attenuation potential and long flow durations. A leachate collection system as well as a surface run-off containment system is provided in the operational plan. Each of these is provided to safeguard surface water quality as described in Appendix A. They will be constructed in stages as the site is developed. Examples of this staging are given in Drawing G6 -*





#### LEGEND

AREAS OF SOME ENVIRONMENTAL CONCERN  
WITHIN THE PROPOSED M4 ZONE.

A— IMPORTANT AREAS FOR FISH

B— IMPORTANT AREAS FOR AMPHIBIANS AND  
REPTILES

NOTE: A DETAILED ENVIRONMENTAL INVENTORY FOR  
THE ENTIRE SITE IS PRESENTED IN THE ENVIRONMENTAL  
APPRAISAL REPORT.

Diagram 1

**Areas of Environmental Concern**  
**Glanbrook Landfill Site**  
The Regional Municipality of  
Hamilton – Wentworth



*Stage II - Development Plan.*

*Visual aspects were considered and a detailed perimeter planting program has been developed to provide screening. The program is designed to screen the view of passing motorists and also adjacent residents. The planting program is described in Appendix B and is shown on Drawings 2 and 3 (End Use).*

*Noise generation at the landfill site was considered and it would found within acceptable levels. As reported in the "Noise Impact Analysis" report:*

*"It is concluded that based on site conditions and the noise control measures adopted, the noise impact of all of the operations associated with the Glanbrook Landfill Site will be negligible or within the limits considered acceptable by the Ministry of the Environment".*

*The land on a portion of the site will experience a significant change in use. This change can be viewed in a positive way. As excavation and landfilling of the cells occurs, a solution to the Region's day to day landfilling needs is provided. As the progressive rehabilitation program proceeds, a publicly owned land resource will begin to take form.*

*An end use plan and an alternative are provided in Appendix B. The agricultural end use plan (shown on Drawing 2: Agricultural End Use) restores the site to a workable area of Classes 2, 4 and 5 agricultural capability. The conservation alternative (shown on Drawing 3: Conservation and Recreational End Use) creates a landscaped recreational area for outdoor enjoyment year round. The selection of any end use is subject to the future consideration of the Region, the local municipality and other interested parties.*







#### 4.4 Summary of Impact Reduction Measures

*As stated throughout this report exacting effort has been taken to reduce all possible adverse impacts. The major measures are listed below:*

- transfer and landfill sites have been selected with a view to the impact on the immediate neighbourhood of the facility*
- equipment and facilities have been selected or designed with special care*
- an operational plan for the management of the entire system, including the landfill operation, has been prepared*
- an end use plan and an alternative plan for the landfill site have been identified and designed*
- options have been kept open for application of resource recovery technology at a later time*





## 5.0 EVOLUTION OF THE PROGRAM

*The problem of the disposal of solid waste in the Hamilton-Wentworth area was first recognized in the early 1960's. At that time and after considerable investigation and review, the City of Hamilton decided to proceed with the construction of the incinerator with metal and energy recovery capabilities, now known as SWARU. This facility was completed in 1972.*

*In 1971 the Waste Management Branch of the Ontario Department of Energy and Resource Management, the County of Wentworth and the City of Hamilton decided to proceed with a study of the disposal of solid wastes in the Region. Proctor and Redfern, consulting engineers and planners, were retained to complete this study.*

*The following reports were completed by Proctor and Redfern prior to the establishment of Regional government in the Hamilton-Wentworth area:*

<i>First Preliminary Report</i>	<i>August 1972</i>
<i>Second Preliminary Report</i>	<i>October 1972</i>
<i>Working Document for Final Report</i>	<i>September 1973</i>
<i>Summary Report of Work to Date</i>	<i>January 1974</i>

*Following the establishing of the Regional Municipality of Hamilton-Wentworth on January 1st, 1974, Proctor and Redfern was retained by the Region to continue work on the development of a solid waste management system for the Region. The following reports were then prepared:*

<i>Fifth Interim Report</i>	<i>November 1974</i>
<i>Sixth Interim Report</i>	<i>February 1975</i>



*On the completion of the Sixth Interim Report public meetings were held in the Township of Glanbrook and the Town of Ancaster. The recommendations contained in the report were outlined in detail at these meetings and the public were asked to respond to the concept.*

*In response to the public input the following reports were prepared:*

*Report on Final Recommendations and Response to Public Input*

*February 1976*

*Summary of Final Report and Hydrogeological Aspects*

*February 1976*





### 5.1 Development of the Waste Management Contract

*Following receipt of this final report, Proctor and Redfern were instructed by the Regional Engineering Services Committee to ask private industry to submit proposals on a waste management system for the Region. At a meeting held with representatives of private industry it was made quite clear to the Region that due to the cost of developing proposals, private industry would not submit general proposals but would respond to a specific tender call for a waste management system for the Region.*

*Regional Council approved the calling of tenders on a waste management system on September 7th, 1976. Tenders closed on February 25th, 1977.*

*The tender documents specified no specific system. The contractors were asked to submit proposals/tenders on any system they wished to offer. Tentative locations for a landfill site and transfer stations were shown but contractors were free to include any other sites they wished to propose. The contractors could either include or exclude the operation of SWARU in their proposal.*

*After an initial review of the tenders received, it was noted that no alternative sites had been suggested and that all proponents needed a landfill site. It was therefore recommended to Council that:*

- 1. The Region acquire Lots 26, 27 and 28, Concession 9 and 10 and part of the unopened road allowance between Concession 9 and 10 in the former Township of Binbrook for a Regional solid waste disposal site.*







2. The Commissioner of Engineering be authorized to proceed with detailed discussions with the Area Municipalities on the acquisition of the transfer station sites.
3. The Commissioner of Planning be authorized to check all official plans and zoning by-laws that might affect the proposed landfill site or transfer stations and initiate any changes.

This was approved by Regional Council on March 7th, 1977.

A Steering Committee was established by Regional Council to review the tenders. As part of this review process, members of the Steering Committee visited a number of municipalities throughout North America operating similar facilities to those offered by the proponents. The Steering Committee then prepared the following reports:

Report to Engineering Services Committee Proposal/Tender Evaluation	July 1977
Appendix to Report on Tender Evaluation	July 1977
Final Report to Engineering Services Committee	August 1977

These reports recommended to Regional Council that a detailed agreement be negotiated with Tricil Limited for the modification and operation of SWARU, the construction of three transfer stations, the transfer of the waste to a sanitary landfill site in Glanbrook, and the operation of the landfill site. Negotiations were successfully concluded and this agreement was signed by the Region and Tricil on October 5th, 1977.



## 5.2 Landfill Site Selection

A filtering process was employed to identify a target area in the Region within which a suitable landfill site could be found. Then a particular site within the target area was identified.

A detailed review of the filtering process is given in the Landfill Site Selection Report. The filtering process used to identify the target area considered the following constraints:

- existing land use
- hydrogeology
- airport proximity
- haul costs
- centres of waste generation
- access to site

Built-up urban areas were not considered as viable areas for a target zone. Similarly areas likely to be designated for future urban development were not considered.

Hydrogeological considerations narrowed the search for a target area considerably to an east-west zone along the southern third of the Region. This is termed the "most suitable" zone as determined as early as 1973 and formalized in the Gartner Lee Associates report of January 1976 (as shown on Drawing 1: Hydrogeological Conditions, in their report.

An airport proximity constraint further narrowed the search. Landfill operations are not permitted closer than six miles from an operating airport. The six-mile radius from Mount Hope Airport eliminated a large portion of the suitable area. This left three possible target areas - one in Flamborough, one in Ancaster, and one in Glanbrook.



Haul costs and centres of waste generation were reviewed. Transportation economics indicated a significant advantage of the Glanbrook target area over the other two. Therefore, a target zone in Glanbrook was preferred. The ease of access by transfer vehicles using Highway No. 56 confirmed the selection of this target zone.

A detailed comparison of sites within the target area is given in the Landfill Site Selection Report. Within the target area several sites can be found that suit the engineering and design needs of a managed landfill operation. The particular site identified on Drawing G1 of this report has a number of favourable aspects including:

- it was resolved by Binbrook Township Council in April 1973

"That the Steering Committee of the Hamilton-Wentworth Waste Management Study and the Engineering Firms concerned, be requested to investigate an area at the extreme south end of Binbrook Township on the Binbrook - Seneca Townline, east of #56 Highway as an alternative to all other areas of the Township for a landfill site".

- the site is only divided into three parcels by ownership
- easy access is permitted due to close proximity to Highway No. 56
- the fewest number of residents are located adjacent to the site
- the site has high potential for the development of attractive and useful end use alternatives given its location and topography.





## 6.0 IMPLEMENTATION OF THE PROGRAM

*The proposed land use at the transfer stations and at the landfill site must be in conformity with the Official Plans and Zoning By-laws of the Area Municipalities.*

*At the Regional Council meeting held on March 7th, 1977 the Commissioner of Planning was instructed to initiate any required changes to these Official Plans and Zoning By-laws.*

*Changes have been initiated on the Official Plan, Zoning By-law, and Parkway Belt West for the Dundas transfer station and on the Zoning By-law for the Mountain transfer station. No changes are required for the Kenora Avenue transfer station.*

*As soon as approval of the changes is received, application will be made to the Ministry of the Environment for approval of the proposed transfer stations.*

*The changes to the Official Plan and Zoning By-law of the Township of Glanbrook to permit the establishment of the Glanbrook landfill site will be the subject of an Ontario Municipal Board hearing. When approval of these changes has been received, application will be made to the Ministry of the Environment for approval of the landfill site. This approval may require a hearing under the Environmental Protection Act.*

*The Agreement between the Region and Tricil and the acquisition of the landfill site are also the subject of an Ontario Municipal Board hearing.*

*As soon as all necessary approvals are received, work can start on the detailed design and the construction of the transfer stations and also on the preparation of the landfill site. These facilities must all be ready for use by March 1980.*







*The approval process is lengthy. As can be seen from Appendix C (Scheduling) the minimum time that it will take to obtain all necessary approvals and also carry out the design and construction of the facilities will mean that these facilities are not ready for use until March 1980. The existing landfill space will also be completely filled by March 1980. Time is therefore critical.*





## 7.0 CONCLUSIONS

*The overall system is a major step forward in the disposal of solid waste and makes the Hamilton-Wentworth Region one of the forerunners in this field in North America.*

*The upgrading of SWARU will significantly reduce the amount of waste to be landfilled and will provide an opportunity for the recovery and use of the metal and the steam generated in the process. The transfer stations will provide convenient aesthetic locations for the Area Municipalities, private haulers and the public to deposit their wastes. In addition, the use of transfer vehicles to haul the waste to the landfill site will minimize the traffic impact at the landfill site and will make it easier to operate and control the size in an environmentally acceptable manner.*

*The design of the transfer stations is such that they can easily be modified to include the installation of future resource recovery facilities when they become economically viable.*

*The locations of the transfer station sites have been selected to have a minimum effect to the adjoining properties. The location of the sanitary landfill site has been dictated by cost, land use and hydrogeologic considerations. As noted in the draft Official Plan of the Region, the proper land-filling of solid waste is recognized as a legitimate, safe means of disposal. The effects of the proposed landfill site upon the adjacent properties will be minimized by careful planning and design, provision of a large buffer zone, and by giving due consideration to any environmental effect of the site. The end use plan makes it possible to rehabilitate the site so that it can be returned to an agricultural land use.*





*The alternative plan shows a recreation end use. Either of these plans will make this site a future asset to the community.*

*Time is critical. All necessary approvals must be obtained as quickly as possible so that the design of the facilities can proceed so that they can be constructed and ready for use not later than March 1980.*





## 8.0 SELECTED BIBLIOGRAPHY

### a). Proctor and Redfern Limited

1. First Interim Report May 1972
2. Second Interim Report October 1972
3. Working Documents for Final Draft (Third Interim Report) September 1973
4. Summary Report of Work to Date (Fourth Interim Report) January 1974
5. Fifth Interim Report November 1974
6. Sixth Interim Report February 1975
7. Report on Final Recommendations and Response to Public Input February 1976
8. Summary of Final Report and Hydrogeological Aspects February 1976

### b). Solid Waste Management Steering Committee

1. Report to Engineering Services Committee - Proposal/Tender Evaluation July 1977
2. Appendices to Report on Proposal/Tender Evaluation July 1977
3. Final Report to Engineering Services Committee August 1977
4. Synthesis Report (this report) July 1978

### c). Gartner-Lee Associates Limited

1. Hydrogeological Impact Study  
Selected Potential Landfill Sites  
Hamilton-Wentworth Region for  
Proctor and Redfern October 1974
2. Hydrogeological Study  
Solid Waste Aspects  
Hamilton-Wentworth Region January 1976
3. Interim Report - Hydrogeological  
Study - Proposed Glanbrook  
Sanitary Landfill Site for  
Regional Municipality of  
Hamilton-Wentworth December 1976







d). Other Pertinent Reports

1. Preliminary Report - Waste Management Study - Wentworth County and Adjacent Areas  
(Prepared by Waste Management Branch, Ontario Department of Energy and Resources Management)  
May 1971
2. Final Agreement between the Regional Municipality of Hamilton-Wentworth and Tricil Limited  
Full Service Solid Waste Management  
February 7, 1978
3. Draft Official Plan for Hamilton-Wentworth Region  
(prepared by Planning and Development Department)  
March 1978

e). Technical Reports

1. Final Report  
Hydrogeological Study  
Proposed Sanitary Landfill Site  
Township of Glanbrook for  
The Regional Municipality  
of Hamilton-Wentworth  
Gartner-Lee  
Associates Limited  
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2. Noise Impact Analysis  
Regarding Glanbrook  
Landfill Project  
Valcoustics  
Canada Limited  
July 1978
3. Transfer Station Site  
Selection  
Proctor and Redfern  
Limited  
June 1978
4. Transportation Study  
Regional Municipality  
of Hamilton-Wentworth  
July 1978
5. Environmental Appraisal  
Proctor and Redfern  
Limited  
July 1978
6. Landfill Site Selection  
Proctor and Redfern  
Limited  
July 1978





- |    |   |   |
|----|---|---|
| 7. | Landfill Design and Site<br>Operation               | Proctor and Redfern<br>Limited<br>July 1978 |
| 8. | Landscape Architecture<br>Design and End Use Report | Proctor and Redfern<br>Limited<br>July 1978 |

Note: These reports are available for interested parties to  
review at the Engineering offices of the Region.





# Solid Waste Management System

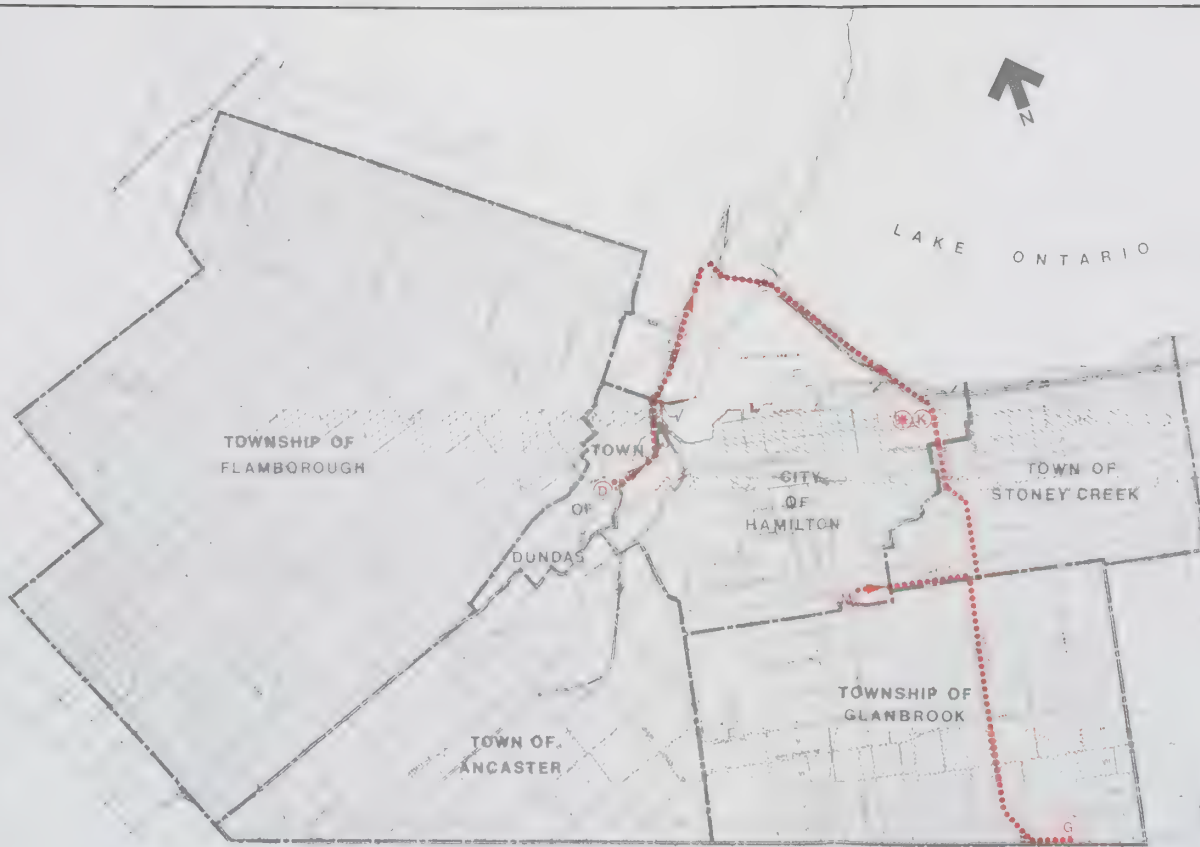
## Site Locations

- \* SWARU (Existing)
- D Dundas Transfer Station
- (M) Mountain Transfer Station
- K Kenora Avenue Transfer Station
- G Glanbrook Sanitary Landfill Site
- North Collection Area - Wastes To Swaru / Kenora Avenue Transfer Station
- South Collection Area - Wastes To Mountain Transfer Station
- West Collection Area - Wastes To Dundas Transfer Station
- Transfer Vehicle Routes

Scale in Miles  
1 1/2 0 1



July 1978













<p>DATE: _____</p> <p>BY: _____</p> <p>SCALE: _____</p>	<p><b>LEGEND</b></p> <p>--- SITE BOUNDARY</p> <p>--- UNITS OF LANDFILL</p> <p>--- TREED AREA</p> <p>--- SANITARY MANHOLE</p> <p>--- SANITARY SEWER</p> <p>--- EXCAVATE 10% DRAIN (6" x 1')</p> <p>--- ACCESS ROAD (LANDFILL SITE)</p> <p>--- ACCESS ROAD (BTRM RETENTION POUNDS)</p> <p>--- STORM RETENTION POUNDS</p> <p>--- STORM DRAINAGE DITCHES</p>	<p>1" = 100'</p>	<p>REGISTERED PROFESSIONAL ENGINEER</p> <p>P. C. MURPHY</p>	<p>REGISTERED PROFESSIONAL ENGINEER</p> <p>P. C. MURPHY</p>	<p>THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH</p> <p>DEPARTMENT OF ENGINEERING</p> <p>GLANBROOK LANDFILL SITE</p> <p>Stage II Development Plan</p>	<p><b>Proctor &amp; Redfern Limited</b></p> <p>Consulting Engineers</p> <p>PROJECT NO. _____</p> <p>DATE: JULY 1978</p> <p>DRAWN BY: B-77192-06</p> <p>CHECKED BY: 0</p>
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## Legend:

- ..... Site Boundary
- Wooded Areas
- Limit of Landfill
- Existing House
- Agricultural Land in Production
- Agricultural Land not in Production

## Glanbrook Landfill Site

The Regional Municipality of Hamilton - Wentworth







End Use  
Agriculture

#### Legend

- Site Boundary
- Wooded Areas
- Limit of Landfill
- Existing House
- 48 inches of cover
- 30 inches of cover
- Road
- Retention Pond

## Glanbrook Landfill Site

The Regional Municipality  
of Hamilton - Wentworth

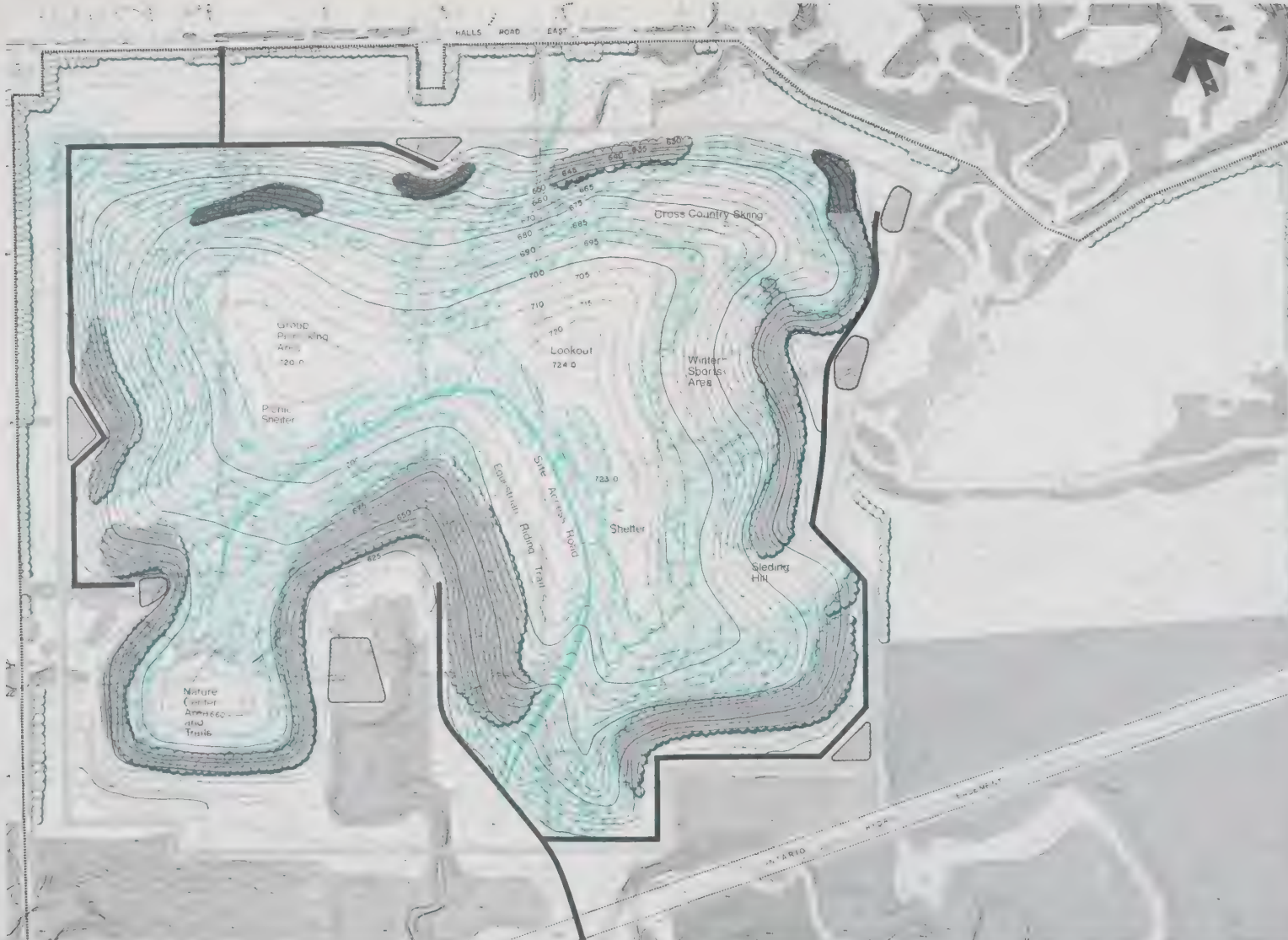


Director & Eastern Limited  
Hamilton, Ontario









## End Use Conservation Recreation

### Legend:

- Site Boundary
- Wooded Areas
- Limit of Landfill
- Existing House
- 48 inches of cover
- 30 inches of cover
- Road
- Retention Pond

## Glanbrook Landfill Site

The Regional Municipality  
of Hamilton - Wentworth



Procter & Redfern Limited  
CONSULTANTS







*APPENDIX 'A'*

OPERATION AND MANAGEMENT  
OF THE LANDFILL SITE





OPERATION AND MANAGEMENT  
OF THE LANDFILL SITE

The Glanbrook Landfill Site will be operated for the Region by Tricil Limited as part of and under the terms of the Full Service Solid Waste Management Agreement. The Region, which is responsible for the design and operation of the site in conformity with the Ministry of the Environment Certificate, will monitor Tricil's operation for strict compliance with the Operational Plan. Under the terms of the Agreement, the Region will be responsible for the construction of the following: major roads, gas venting system, water monitoring system, permanent surface water control system, site building, permanent fencing, site buffering and site rehabilitation. Tricil will be responsible for the following: excavation, deposition and compaction of the waste and cover material, dust and litter control, fire and odour control, vermin control, construction of the leachate collection system, dewatering, operation of the gas and leachate system, construction and maintenance of all on-site roads including maintenance of roads constructed on the site by the Region.

A.1 Staging

For the purposes of site organization, the lands to be zoned for landfill purposes, have been divided into four stages referred to on Drawing G6 - Stage II - Development Plan. Each stage will have a capacity of between four and five years of landfilling (based on our estimate of tonnages referred to in Table 1. The sequence of cell filling will be in accordance with ascending cell order number referred to in Drawing G6 Stage II - Development Plan. As one stage is nearing completion, the services for the subsequent stage will be constructed.





The site life of the landfill site is estimated to be approximately 20 years based on the following:

- 1). Our estimate of tonnages to be disposed of by the Region.
- 2). The Agreement between the Region and Tricil.
- 3). Current technology.

The capacity calculations are based on the most pessimistic view. We are optimistic that variation in the above will increase the site life to the point that Stage IV of the site, Cells 13 through 15, may not be required.

## A.2 Hydrogeology

The hydrogeology of the site is made up of two separate components. These are surface water and groundwater.

### A.2.1 Surface Water Containment

In the design of the site, we have utilized the concept of surface water containment. This is accomplished by a series of temporary and permanent ditches that direct surface run-off to a number of retention ponds. In a normal precipitation event, these ponds have capacity to store all of the surface run-off. This method allows for monitoring of the run-off for possible contamination. Also the ponds act as sedimentation basins.

### A.2.2 Leachate Collection System

Leachate is the product of the leaching process by water as it percolates through garbage. The native clay in the area has a very low permeability and therefore the groundwater velocity is very small. For this reason as well as the clay's capacity for ion exchange, the groundwater will not be contaminated due to the landfill operation.





The leachate will build up in the cells and if it was not collected would form springs at the toe of the cells. Therefore a collection system has been designed to prevent the level of leachate from rising above the elevation necessary for springs to form. The leachate thus collected will flow through a gravity sewer system to a storage area.

It has been estimated that leachate in each cell will not reach the level necessary for collection for 10 years. During the landfill construction period, the quantities of leachate collected will be very small. Therefore, the leachate will be pumped out and trucked to a sewage treatment plant as required. When the quantities of leachate exceed the limit for economic disposal by the above means (minimum 15 years after commencement), a pumping station and forcemain will be constructed. The leachate will then be pumped to the future sanitary sewer system in Binbrook.

#### A.3 Monitoring Program

An extensive monitoring program will be set up for the above site. The program will monitor the groundwater system, the surface water system and the gas production as required by the Ministry of the Environment.

#### A.4 Landfill Site Operation

The site will be operated between 8:00 a.m. and 8:00 p.m. The site will not be open to the public. Only transfer vehicle owned and operated by Tricil Limited will be allowed to dispose of wastes at the site, unless expressly approved by the Region.

On an average day, 63 transfer vehicles with 75 cubic yard capacity, will haul garbage from the three transfer stations.







These vehicles will be purchased new for this contract and will have all of the latest noise abatement measures incorporated in their construction.

The site access will be from Highway No. 56 on Townline Road. The existing road will be reconstructed with an asphalt surface. The design road grades will be such as to reduce engine noise. The site entrance will be located in an isolated screened area.





*APPENDIX 'B'*

SITE REHABILITATION APPROACH



## SITE REHABILITATION APPROACH

### B.1 End Use Objectives

#### B.1.1 Grading Plan

The Grading Plan for the site is designed to present a natural rolling profile and yet provide for maximum efficiency in the use of the land. The finished levels can be attained without earth export or import since the volumes represent a balance of cut and fill. The Plan allows the greatest flexibility in choice and timing if a decision is made to proceed with the alternative recreation plan. The implications of the grading plan on the existing land use, agricultural classifications, slope conditions and end use alternatives are assessed below.

#### B.1.2 Slope Analysis

A detailed analysis of the 250 acres directly affected by landfill operations has been carried out. This analysis indicates that the grading plan shifts the predominant slopes from 5 percent or less to between 5 and 20 percent.

#### B.1.3 Existing Land Use

The existing site is predominantly Class 2 type land with sub-class limitations (d and t) based on Agricultural Classifications prepared from the Canada Land Inventory Mapping System. The soils are difficult to till, absorb water slowly and/or the rooting zone is restricted. Much of the site, approximately one-third, has adverse topography conditions in terms of steepness and pattern of slopes which limit agricultural use.

#### B.1.4 Agricultural Classification

The grading plan improves the drainage pattern of the site, but increases topographic slope limitations. The shift in



percentage slopes would place approximately 15 acres into Class 6 Agricultural Lands. The remainder of the site could potentially return to Class 5 and possibly Class 4 on the top areas.

#### B.1.5 End Use Plan

The selection of any end use is subject to the future consideration of the Region, the local municipality and other interested parties. A recommended plan and an alternative plan are offered herein. In both cases the existing forest would be maintained in a natural state. Trees would also be planted on all of the perimeter side slopes adjacent to the existing wood lots and these areas would be incorporated in areas to be conserved. The farm fields not affected by the limit of landfill would remain available for agricultural production.

The recommended end use is for agricultural production (refer to Drawing No.2 ). Potential agricultural uses for the site include the following:

- a). Pasture
- b). Christmas tree farm or other reforestration project
- c). Poultry Farm
- d). Cattle Feed Lot.

The actual use will largely be dependent on the demand and economics at the end of the landfill operations. The site could be leased or sold, retaining the right of access for leachate and gas monitoring.

The alternative plan is for conservation and recreation uses. This is detailed on Drawing No. 3. The recreational potential for the site is as follows:





- a). Horseback riding
- b). Wildlife and nature study
- c). Winter sports - toboggoning
  - cross country skiing
  - snow shoeing
- d). Hiking and picnicing

Support facilities required could include parking lots, park shelters, picnic tables, washrooms, a park centre building and maintenance area. The site would presumably remain in public ownership.

## B.2 Landscaping

### B.2.1 Landscape Buffer Treatment

To reduce the visual impact of the landfill operation, buffer planting has been proposed around the perimeter of the site where natural buffering does not exist. The treatment basically consists of providing dense shrub planting to block the views of motorists as well as higher visual screens to buffer long distance views and neighbouring residents.

The screens will utilize a high percentage of coniferous plant material to provide screening during the winter season. A mixture of hardwood and rapid growing deciduous materials are incorporated to add greater depth and bulk to the buffer treatment during the spring, summer, and fall seasons. Berms have not been utilized as the degree of disturbance in their creation offsets any benefits.

### B.2.2 Landscape Rehabilitation

Due to the large site area, a progressive slope rehabilitation programme is possible. Not only will progressive landscape rehabilitation reduce erosion during landfill operations, but it will speed the re-establishment of the landscape.



### B.2.3 Soil Testing

Soil testing of both the respread stockpiled topsoil and final cover material with the application of the appropriate soil conditioners and fertilizers should be undertaken prior to seeding and planting.

The recommended depth of topsoil and total depth of final cover required will vary depending on the different plant materials recommended. The minimum cover of 24 inches is required to ensure that the plant material will become established without interference from gas seepage and provide a minimum depth for water retention in the soil.

### B.2.4 Plant Materials

To aid in improving soil conditions, the planting of a legume and grass blend on all slopes within the landfill site is recommended. The blend selected will be determined after soil testing. Temporary side slopes should be seeded with a quick cover grass blend to reduce erosion.

To create the most natural appearance, native plant materials have been recommended. They have been selected because of their hardiness and adaptability to poor site conditions and to reduce long term maintenance.



*APPENDIX 'C'*

SOLID WASTE MANAGEMENT  
SYSTEM SCHEDULING





# SCHEDULING

JULY 1978





DATE	<i>Aug. 1/78</i>
ISSUED BY	
CHECKED BY	<i>Bob.</i>
ADDENDA	

HAMILTON PUBLIC LIBRARY



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